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STANDARDIZING CONTAINER SIZES FOR SHIPPING FRESH MEAT PRODUCTS

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SUMMARY

Four retail chainstore distribution warehouses that received fresh beef, pork, and lamb products were studied. This study was conducted to obtain a description of the various size shipping containers used today, to determine the amount of container damage, and to identify specific problem areas associated with packaging, handling, and distributing domestic boxed, fresh meat.

There were 69 container sizes used for 42 beef and pork products. No lamb products were received in shipping containers. Up to 10 container sizes were used per meat cut. All shipping containers were made of corrugated fiberboard, and there were several different container types. The most commonly observed container sizes, in inches, were 21.9 x 17.0 x 9.2, 22.4 x 15.3 x 11.1, 22.3 x 14.0 x 9.4, and 17.2 x 11.3 x 9.0. These sizes represented more than one-half of the beef cuts shipped in containers. In most cases, fresh beef and pork products were not packed in the same size containers. The multiplicity of container sizes was more apparent with the shipping containers used for pork than with those used for beef products.

Most shipping containers could not be handled efficiently on the 48- by 40-inch pallet size used in the warehouses. Only 19 percent of the 69 container sizes used for fresh beef and pork products had a maxi-

mum pallet surface utilization of more than 90 percent. Eight potential container sizes were developed that could be used for the many container sizes and could utilize the maximum pallet surface of the 48- by 40-inch pallet with no overhang. Five of the eight container sizes utilized 100 percent of the pallet surface. These eight container sizes could be substituted for nearly 60 percent of the 69 container sizes and could be used by 32 of the 42 fresh beef and pork products (approximately 76 percent).

Much container damage appeared to result from the many sizes of containers that did not permit the use of proper stacking methods. Some containers were allowed to hang beyond the basic dimensions of the pallet. Generally, pork products and their respective shipping containers had more container damage than did the shipping containers used for beef products. Pork loin containers accounted for 33 percent of all container damage.

Industry consideration should be given to reducing or curbing the proliferation of container sizes used. Particular emphasis should be directed toward the development of standard container sizes that can maximize use of the pallet surface and thus be more readily palletized. More attention should be given to standardizing the number of pieces per box for the various meat cuts.

INTRODUCTION

A current trend in meat distribution is to ship fresh, fabricated beef and pork products in shipping containers rather than in carcass form. Because of probable savings in handling and transportation

costs, as well as better protection to the meat because of less contamination and shrinkage, this trend will likely increase in the future. It has been reported that in 3 to 5 years, 40 percent of all fresh beef will be shipped boxed as primal cuts in palletized units.²

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²Collings, G. W., and others. Development of a planning framework and analysis of general strategy alternatives in meat and poultry processing, distribution, and marketing. Battelle Mem. Inst., Columbus, Ohio, p. 27, May 1968.

This trend from a carcass to a boxed-meat distribution system may cause several problems to develop for both manufacturers and users of containers. An increase in the number of different types and sizes of shipping containers may occur. Moreover, many containers may not be readily adaptable to current handling methods, with the result that container damage may increase.

Various studies have been conducted with dry groceries, packaged luncheon meats, and fruits and vegetables to illustrate the multiplicity of shipping container sizes used today. For example, a study conducted in a typical large chainstore warehouse indicated that about 1,200 sizes and shapes of shipping containers were used. As many as six sizes of

shipping containers were used for the same size item.

In another study in a large chainstore warehouse, there were 124 case sizes for 168 packaged luncheon meats.³ However, there is a general lack of published information on the types and sizes of shipping containers used for fresh meat and the performance of these containers under present handling methods.

The purpose of this study was to: (1) Obtain a description of the various types and sizes of containers currently used for shipping fresh beef, pork, and lamb products, (2) determine the amount of container damage for different meat products, and (3) identify specific problem areas associated with packaging, handling, and distributing boxed, fresh meat.

PROCEDURE

The universe studied was retail chainstore distribution warehouses that receive domestic meats and meat products (excluding fish, poultry, and mixed, prepared foods). Four warehouses were selected at different geographic locations on the east coast as the sample for this study. These locations were Atlanta, Ga.; Washington, D.C.; Elizabeth, N.J.; and East Hartford, Conn. Furthermore, these four warehouses were assumed to be able to provide a reasonably accurate indication of the boxed meat-shipping containers used at all east coast distribution warehouses.

A questionnaire was designed to collect data on the types and sizes of shipping containers, container damage, and handling practices (see appendix). Additional information was gathered regarding packaging materials, volume of movement, and source of supply. This questionnaire was precoded to facilitate programming and analyzing these data on a computer.

Container damage data (type of damage and causes) were collected for fresh beef and pork products and their respective shipping containers. Up to one hundred containers were sampled when a particular container showed damage that was considered commercially important.

The data were collected by personal observation during the regular operating workweek at each sample warehouse. Only containers on the floor at that time were studied. A questionnaire was completed when the supplier, meat product or cut, type of container, or outside dimension changed. This report deals with the data collected regarding fresh meat products or cuts.

Eight potential container sizes were derived by: (1) Making a frequency distribution of the outside dimensions found in the study, (2) locating the general areas where most dimensions fell when they were plotted on a graph, and (3) concentrating on these areas for those dimensions that would provide the maximum utilization of space on the surface of the 48- by 40-inch pallet, with no overhang. These dimensions then became the basic dimensions under which all dimensions found in the study were grouped. The grouping was made on the basis of plus or minus 1 inch of the basic dimension.

³Bloom, G. M. Modular packaging and economies in distribution. Talk presented at the 36th Ann. Meeting of the Natl. Assoc. of Food Chains, Sheraton-Boston Hotel, Boston, Mass., p. 1. Oct. 22, 1969.

DESCRIPTION OF SHIPPING CONTAINERS

The types, sizes, pieces per box, and net weights of shipping containers used for fresh beef and pork

products are shown in table 1. No fresh lamb products or cuts were received in shipping containers.

Table 1.—Corrugated fiberboard shipping containers used for fresh beef and pork, by meat product, container type, outside dimensions, number of pieces per box, and average net weight

Meat product	Container type	Outside dimensions			Number of pieces per box	Average net weight
		Length	Width	Height		
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>		<i>Pounds</i>
Beef						
Beef rib	¹ OSC	21.9	17.0	9.2	2	53.50
	² RSC	22.4	15.3	11.1	3	64.10
	OSC	22.4	16.4	7.9	2	48.00
	³ OPT	22.8	17.2	10.1	2	47.75
	OSC	24.6	19.2	10.4	2	42.40
Beef rib, short	RSC	17.2	11.3	9.0	1	24.00
Beef loin, strip	OSC	19.5	15.3	10.5	5	60.00
	OSC	21.9	17.0	9.2	3	53.00
Beef loin	OSC	24.6	19.2	10.4	1	41.60
	OSC	28.5	18.2	8.2	1	42.00
Beef loin, trimmed	RSC	22.4	15.3	11.1	2	42.50
	OPT	26.2	19.3	9.8	1	40.00
Beef tenderloins	OSC	19.8	11.1	12.4	6	43.00
	OSC	21.9	17.0	9.2	8	48.00
	OSC	23.5	19.6	9.8	3	68.50
	OSC	24.7	16.7	9.7	10	76.00
Beef brisket, boneless	RSC	17.2	11.3	9.0	1	24.00
	OSC	19.5	15.3	10.5	3	33.00
	OSC	20.2	16.3	6.5	5	38.00
	⁴ PT	21.0	15.7	6.3	2	26.00
	OSC	21.9	17.0	9.2	10	79.00
	⁵ FT	22.0	15.9	6.3	4	50.38
Beef round	OPT	19.5	16.5	10.5	3	54.00
	RSC	22.4	15.3	11.1	2	60.40
	OSC	24.6	19.2	10.4	2	58.60
Beef round, knuckle	OSC	21.9	17.0	9.2	2	65.00
	OSC	23.8	18.0	9.7	5	69.50
Beef round, top	OSC	19.8	11.1	12.4	3	65.00
Beef sirloin	OSC	24.0	19.3	11.5	4	89.00
Beef sirloin, tip	OSC	19.5	10.3	10.6	5	52.00
	RSC	20.8	15.0	12.5	5	51.75
	RSC	22.3	14.0	9.4	5	65.00
	OSC	24.5	16.5	10.5	5	66.00
	OSC	25.2	16.1	9.5	5	78.00
Beef trimmings	OSC	21.9	17.0	9.2	2	59.00
	RSC	22.3	14.0	9.4	5	65.00
	RSC	22.4	16.3	6.4	-	60.00
Beef flank steak	OSC	15.0	13.4	6.0	2	22.50
	FT	16.8	13.0	5.0	13	20.00
	RSC	17.2	11.3	9.0	1	24.00
	OSC	18.2	9.5	10.0	2	36.50
	OSC	19.4	11.0	6.4	2	25.00
	OSC	21.9	17.0	9.2	10	97.00

See footnotes at end of table.

Table 1.—Corrugated fiberboard shipping containers used for fresh beef and pork, by meat product, container type, outside dimensions, number of pieces per box, and average net weight—Continued

Meat product	Container type	Outside dimensions			Number of pieces per box	Average net weight
		Length	Width	Height		
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>		<i>Pounds</i>
Beef chuck	OSC	23.5	19.6	9.8	3	77.13
	OPT	26.2	19.3	9.8	2	88.60
Beef chuck, boneless	RSC	22.3	14.0	9.4	5	65.00
Beef chuck, arm cut	RSC	22.4	15.3	11.1	2	52.50
Beef chuck, blade	RSC	22.4	15.3	11.1	2	50.60
Beef chuck, arm & blade	OSC	24.0	19.3	10.5	2	88.40
	RSC	13.4	10.3	6.9	-	15.00
Beef liver	OSC	17.1	10.8	6.4	-	---
	OPT	14.7	12.0	4.5	-	30.00
Veal, boneless	OPT	14.7	12.0	4.5	-	30.00
Hanging tenderloin	RSC	15.4	12.8	4.7	-	20.00
Beef kidneys	RSC	15.4	12.8	4.7	-	20.00
	RSC	17.2	11.3	9.0	1	24.00
Beef skirt pieces	RSC	17.2	11.3	9.0	2	22.00
Beef shoulder, boneless	RSC	18.3	18.3	11.1	5	52.25
Beef butt, shell top	RSC	19.1	17.5	9.9	4	54.00
Veal kidneys	OPT	21.0	16.0	5.8	-	30.00
Veal clods	OPT	21.0	16.0	5.0	-	64.25
Beef fore-shank, boneless	RSC	22.3	14.0	9.4	5	65.00
Beef plate	RSC	22.4	15.3	11.1	2	48.50
Beef tongues & hearts	OSC	26.0	10.7	11.5	4	50.00
Pork						
Pork shoulder butt	OSC	15.1	11.2	7.3	6	29.00
	RSC	16.3	11.3	10.2	5	30.00
	RSC	17.3	10.0	8.4	6	31.75
	RSC	18.1	12.3	7.0	18	31.00
	RSC	18.3	12.4	8.1	-	30.00
	RSC	19.3	15.6	8.8	8	69.00
Pork loins	RSC	21.0	12.1	8.4	5	52.00
	OSC	22.3	12.3	6.0	3	31.00
	OSC	26.5	13.5	8.5	4	49.50
	OSC	28.0	14.0	9.5	5	75.88
	OSC	29.2	11.0	11.5	6	72.00
	RSC	30.1	11.0	11.4	6	76.50
	RSC	30.5	13.1	9.9	5	79.00
	FT	31.5	13.8	8.2	6	85.00
	RSC	36.5	13.2	10.0	5	82.00
	RSC	29.3	10.7	11.9	6	79.88

See footnotes at end of table.

Table 1.—Corrugated fiberboard shipping containers used for fresh beef and pork, by meat product, container type, outside dimensions, number of pieces per box, and average net weight—Continued

Meat product	Container type	Outside dimensions			Number of pieces per box	Average net weight
		Length	Width	Height		
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>		<i>Pounds</i>
Pork bellies	RSC	26.2	13.2	4.0	2	25.88
Fresh ham	OSC	15.1	11.2	7.3	5	31.50
	RSC	19.6	15.8	9.7	-	55.00
	OSC	22.3	13.7	8.4	3	---
Pork sparerib	OSC	15.1	11.2	7.3	13	30.00
	RSC	16.7	11.9	6.9	5	---
	RSC	17.1	11.2	7.1	-	30.75
	RSC	17.2	11.8	6.5	-	30.00
	RSC	17.4	9.9	8.6	-	30.00
	OSC	17.5	12.5	7.9	-	30.00
	OSC	18.3	11.4	6.8	-	30.00
Pork kidneys	RSC	11.5	8.5	4.9	-	15.00
	RSC	13.4	10.3	6.9	-	15.00
Pork tails	OSC	15.0	13.0	7.1	-	25.00
Pork feet	OSC	15.0	13.0	7.1	-	25.00
Pork ears	RSC	18.2	12.2	6.1	-	15.00
	OSC	22.0	10.5	6.5	-	25.00
Pork neck bones	OSC	21.8	11.6	8.4	-	30.00
Pork liver	OSC	26.8	18.0	9.0	-	60.00

¹OSC - Overlapping slotted container.

²RSC - Regular slotted container.

³OPT - One piece tuck-in.

⁴PT - Part telescope.

⁵FT - Full telescope.

Types

All the various types and styles of shipping containers used for fresh beef and pork products were made of corrugated fiberboard. Eighty-nine percent of the fiberboard shipping containers were either regular slotted containers (RSC) or overlapping slotted containers (OSC). The remaining container types were the one-piece tuck-in (OPT), full-telescope (FT), and the part-telescope (PT).

Sizes

It was found that 69 container sizes were used for 42 fresh beef and pork products. Of these, 38 container sizes were used for 31 beef products. This was a ratio of about 1 to 1—one different size container for each product. There were 32 container sizes used for 11 pork products. This was a ratio of approximately 3 to 1, and the multiplicity of container sizes used for fresh meat becomes more apparent. However, the multiplicity of container sizes was more pronounced for a specific meat cut than it was for different meat cuts.

Up to 10 container sizes were used per meat cut. Pork loins were shipped in more container sizes (10) than was any other meat product. Other meat products shipped in many container sizes were: spare-ribs (7), pork shoulder butts (6), boneless beef brisket (6), flank steaks (6), beef sirloin tips (5), and beef ribs (5). Very little evidence was found where both fresh beef and pork products were packed in the same size

container. One common-size container (13.4 in. x 10.3 in. x 6.9 in.) was used to ship fresh beef liver and pork kidneys.

There was some evidence of uniformity, despite the apparent proliferation of container sizes for fresh meat. The most commonly observed container sizes, in inches, were 21.9 x 17.0 x 9.2, 22.4 x 15.3 x 11.1, 22.3 x 14.0 x 9.4, and 17.2 x 11.3 x 9.0, respectively.⁴ These four container sizes were used solely for the 31 beef products found in this study. More than one-half of the beef products were shipped in these four sizes.

Pieces Per Box

The number of pieces of fresh beef and pork per container varied from one to 18. In addition, there was little uniformity in the number of pieces of fresh meat packed in the various sizes of containers for a specific meat product. The only exception was beef sirloin tip, which had five pieces of meat packed in all of its containers.

Weights

The weight of the contents also varied considerably. Many shipping containers of fresh beef and pork were packed fairly heavily. The average net weight of the fresh meat packed in the shipping containers ranged from 15 to 97 pounds. The net weight of the meat packed in almost one-half of the containers studied ranged from 50 to 97 pounds.

GENERAL OBSERVATIONS AND PROBLEMS

Most fresh beef and pork products received at the sample warehouses were not palletized. The meat was received by truck in break-bulk and was unloaded manually onto 48- by 40-inch wooden pallets. Forklifts or handtrucks were used to transport the pallets of meat to warehouse storage.

As mentioned earlier, many shipping containers of fresh beef and pork were fairly heavy, which made them difficult to handle manually. Moreover, shifting of the product within the container was also observed. This further complicated handling. Inspection of the contents revealed that excessive space within the container allowed free movement of the meat.

Most shipping containers did not fit or conform well to the 48- by 40-inch pallet size used in the

warehouses. Furthermore, some containers were allowed to hang beyond the basic dimensions of the pallet. This caused the containers to lose much of their inherent strength and to damage more easily.

It was a general practice of the warehouses to mix-load meat products on pallets for store delivery. This led to a conglomeration of container sizes handled on one pallet at the same time. The result was an unstable unit load that frequently caused part of the load to fall off, causing unnecessary product and container damage.

⁴Based upon the number of questionnaires completed, the commonly observed container sizes were determined for the 69 container sizes used for fresh beef and pork products (appendix, table 5).

CONTAINER DAMAGE

Evidence of container damage was observed for the shipping containers used for fresh beef and pork products. However, the damage reported represents only what happened to the container and does not indicate the effect of the damage on the meat inside. Generally, the containers used for pork products exhibited more damage than those used for beef products.

Container damage was observed in six of the 31 beef products, compared with six of the 11 pork products. Damage to pork loin containers accounted for 33 percent of all container damage; damage to fresh ham containers, 19 percent; and damage to pork shoulder containers, 10 percent (table 2). The most prevalent type of container damage was crushing, which accounted for 72 percent of the damage; followed by broken containers, 8 percent; and bulged containers, 7 percent. Probable causes of container damage, as identified by observation, were: (1) Too much overhead weight, which caused the container to weaken; (2) improperly packaging the meat cut, which caused dripping from the fresh meat; (3) under-packaging or overpackaging the contents; (4) mechanical damage from a forklift or handtruck; and (5) inadequate construction of the container. Damage to fresh meat containers appears to be a growing problem that will have to be confronted in the near future.

Table 2.—Meat-shipping-container damage by type of cut and type of damage

Type of meat cut	Type of damage			Total amount of damage
	Bulged ¹	Crushed ²	Broken ³	
	Percent	Percent	Percent	Percent
Beef				
Brisket		0.76		0.76
Flank steak		5.20	0.15	5.35
Sirloin tip	1.22	2.29	.30	3.81
Tongues & hearts61	.15	.76
Top round45	.45
Livers		9.64		9.64
Pork				
Ears61		.61
Hams91	16.84	1.22	18.97
Kidneys91	.76	1.67
Loins	2.60	27.10	3.21	32.91
Shoulders	2.14	7.50	.45	10.09
Spareribs45	1.37	1.82
Total	6.87	71.91	8.06	

¹ Bulged: Those containers in which the walls were pushed outward more than 1 inch.

² Crushed: Those containers that were compressed 2 inches or more.

³ Broken: Those containers that were punctured or split open.

DISCUSSION

Most shipping containers used for fresh beef and pork could not be handled efficiently on the 48- by 40-inch pallet size used in the warehouses (appendix tables 6 and 7). Only 19 percent of the 69 container sizes used had a maximum pallet surface utilization of 90 percent or more with no allowable overhang (table 3). About 38 percent utilized less than 80 percent of the pallet surface. Poor utilization of space on the pallet surface for these containers was further complicated by the many sizes of containers within the distribution system. Therefore, there is a real need for container standardization because of broadening distribution patterns, trends toward increased volumes of boxed meat, and the development of palletized handling methods.

As an approach to reducing the multiplicity of container sizes and utilizing the maximum pallet surface, some potential container sizes that could be substituted for the many sizes presently used were

developed. In this approach, the height of a container was not considered. The main concern was the container length and width, because these are the only container dimensions that affect pallet surface area. Eight potential container sizes were developed to fit the 48- by 40-inch pallet using at least 90 percent of the pallet surface with no overhang (table 4). Five of these eight container sizes utilized 100 percent of the pallet surface. These eight container sizes could be substituted for nearly 60 percent of the 69 container sizes and could be used by 32 of the 42 fresh beef and pork meat products (approximately 76 percent).

There are many approaches around which standardization can be attempted. These eight container sizes are suggested only as a means of coordinating an industry effort to look at the multiplicity of containers used for fresh meat and the complex problems involved.

Table 3.—Sizes of shipping containers used for fresh beef and pork products with 90 percent or more pallet surface utilization of space on 48- by 40-inch pallet (no overhang)

Outside dimensions			Percent of pallet surface utilization	Number of containers per layer	Meat products
Length	Width	Height			
<i>Inches</i>	<i>Inches</i>	<i>Inches</i>			
15.0	13.0	7.1	91.4	9	pork tail, pork feet
16.8	13.0	5.0	91.0	8	beef flank steak
17.2	11.3	9.0	91.1	9	beef shortribs, boneless beef brisket, beef flank steak, beef kidney, beef skirt pieces
17.3	10.0	8.4	90.1	10	pork shoulder butt
17.5	12.5	7.9	91.1	8	pork sparerib
18.2	9.5	10.0	90.1	10	beef flank steak
19.3	15.6	8.8	94.1	6	pork shoulder butt
19.5	15.3	10.5	93.2	6	beef loin, strip beef brisket, boneless
19.8	11.1	12.4	91.6	8	beef tenderloin, beef top round
22.0	15.9	6.3	91.0	5	beef brisket, boneless
23.5	19.6	9.8	96.0	4	beef chuck, beef tenderloin
24.0	19.3	10.5	96.5	4	beef chuck, arm & blade
24.0	19.3	11.5	96.5	4	beef sirloin

Table 4.—Potential container sizes for fresh beef and pork products on 48- by 40-inch pallets (no overhang)

Outside dimensions		Percent of pallet surface utilization	Number of containers per layer	Meat products
Length	Width			
<i>Inches Inches</i>				
16.0	x 12.0	100	10	pork tail, pork feet, pork shoulder butt, pork sparerib, beef kidney, hanging tenderloin, fresh ham, beef flank steak
17.2	x 11.4	¹ 92	9	beef liver, pork spare-rib, beef shortrib, boneless beef brisket, beef flank steak, beef kidney, beef skirt pieces, pork shoulder butt, pork ears
18.3	x 9.6	¹ 92	10	pork shoulder butt, pork sparerib, beef flank steak
20.0	x 12.0	100	8	beef flank steak, beef tenderloin, beef top round, pork loin
20.0	x 16.0	100	6	pork shoulder butt, beef strip loin, boneless beef brisket, beef round, fresh ham, beef sirloin tip, veal clod, veal kidney
22.0	x 16.0	¹ 92	5	beef round knuckles, beef flank steak, beef trimmings, beef strip loin, beef tenderloin, boneless beef brisket, beef rib, beef trimmed loin, beef round, beef arm-cut chuck, beef blade chuck, beef plate
24.0	x 16.0	100	5	beef sirloin tip, beef tenderloin
24.0	x 20.0	100	4	beef chuck, beef tenderloin, beef arm & blade chuck, beef sirloin, beef loin, beef rib, beef round

¹ Figure rounded to the nearest whole percent.

CONCLUSIONS AND RECOMMENDATIONS

The data revealed a multiplicity of container types and sizes used to ship fresh beef and pork products. This multiplicity was more pronounced for a specific meat cut than it was for different cuts. Also, considerable variability existed between the quantity of meat packed in each container and the number of pieces in each one. The multiplicity of container sizes was more apparent with the shipping containers used for pork than with those used for beef products. Most shipping containers used for fresh beef and pork could not be handled efficiently on the 48- by 40-inch pallet size used in the warehouses. Much container damage resulted from the many different size containers that did not permit the use of proper stacking methods.

Industry consideration should be given to reducing or curbing the proliferation of container sizes in use. Particular emphasis should be directed toward the development of standard container sizes which can make maximum use of the pallet surface and thus be more readily palletized. Also, more attention should be given to standardizing the number of pieces per box for the various meat cuts. Therefore, the standardization of shipping containers could mean savings in handling and storage costs, as well as reduced packaging material inventories, and should be of considerable help in order selection and delivery.

APPENDIX

Table 5.—Frequency distribution of corrugated fiberboard shipping containers used for fresh beef and pork products, by outside dimension

Outside dimensions			Number of ques- tionnaires	Number of different meat products	Outside dimensions			Number of ques- tionnaires	Number of different meat products
Length	Width	Height			Length	Width	Height		
<i>Inches</i>	<i>Inches</i>	<i>Inches</i>			<i>Inches</i>	<i>Inches</i>	<i>Inches</i>		
11.5	8.5	4.9	1	1	21.0	16.0	5.0	1	1
13.4	10.3	6.9	2	2	21.0	16.0	5.8	1	1
14.7	12.0	4.5	1	1	21.8	11.6	8.4	1	1
15.0	13.0	7.1	2	2	21.9	17.0	9.2	7	7
15.0	13.4	6.0	1	1	22.0	10.5	6.5	1	1
15.1	11.2	7.3	3	3	22.0	15.9	6.3	1	1
15.4	12.8	4.7	2	2	22.3	12.3	6.0	1	1
16.3	11.3	10.2	1	1	22.3	13.7	8.4	1	1
16.7	11.9	6.9	1	1	22.3	14.0	9.4	5	4
16.8	13.0	5.0	1	1	22.4	15.3	11.1	6	6
17.1	10.8	6.4	1	1	22.4	16.3	6.4	1	1
17.1	11.2	7.1	1	1	22.4	16.4	7.9	1	1
17.2	11.3	9.0	5	5	22.8	17.2	10.1	1	1
17.2	11.8	6.5	1	1	23.5	19.6	9.8	2	2
17.3	10.0	8.4	1	1	23.8	18.0	9.7	1	1
17.4	9.9	8.6	1	1	24.0	19.3	10.5	1	1
17.5	12.5	7.9	1	1	24.0	19.3	11.5	1	1
18.1	12.3	7.0	1	1	24.5	16.5	10.5	1	1
18.2	9.5	10.0	1	1	24.6	19.2	10.4	3	3
18.2	12.2	6.1	1	1	24.7	16.7	9.7	1	1
18.3	11.4	6.8	1	1	25.2	16.1	9.5	1	1
18.3	12.4	8.1	1	1	26.0	10.7	11.5	1	1
18.3	18.3	11.1	1	1	26.2	13.2	4.0	1	1
19.1	17.5	9.9	1	1	26.2	19.3	9.8	2	2
19.3	15.6	8.8	1	1	26.5	13.5	8.5	1	1
19.4	11.0	6.4	1	1	26.8	18.0	9.0	1	1
19.5	10.3	10.6	1	1	28.0	14.0	9.5	1	1
19.5	15.3	10.5	2	2	28.5	18.2	8.2	1	1
19.5	16.5	10.5	1	1	29.2	11.0	11.5	1	1
19.6	15.8	9.7	1	1	29.3	10.7	11.9	1	1
19.8	11.1	12.4	2	2	30.1	11.0	11.4	1	1
20.2	16.3	6.5	1	1	30.5	13.1	9.9	2	1
20.8	15.0	12.5	1	1	31.5	13.8	8.2	1	1
21.0	12.1	8.4	1	1	36.5	13.2	10.0	1	1
21.0	15.7	6.3	1	1					

Table 6.—Listing of corrugated fiberboard shipping containers used for fresh beef products and corresponding pallet surface utilization of space on a 48- by 40-inch pallet (no overhang)

Outside dimensions			Container type	Meat product	Maximum pallet surface utilization of space on 48- by 40-inch pallet	
Length	Width	Height			Number of containers per layer	Percent
<i>Inches</i>	<i>Width</i>	<i>Height</i>				
13.4	10.3	6.9	¹ RSC	Beef liver	11	79.1
14.7	12.0	4.5	² OPT	Veal, boneless	10	91.9
15.0	13.4	6.0	³ OSC	Beef flank steak	6	62.8
15.4	12.8	4.7	RSC	Hanging tenderloin		92.4
				Beef kidney		
16.8	13.0	5.0	⁴ FT	Beef flank steak	8	91.0
17.1	10.8	6.4	OSC	Beef liver	9	86.6
17.2	11.3	9.0	RSC	Beef shortrib	9	91.1
				Beef brisket, boneless		
				Beef flank steak		
				Beef kidney		
18.2	9.5	10.0	OSC	Beef skirt pieces		
18.3	18.3	11.1	RSC	Beef flank steak	10	90.1
				Beef shoulder, boneless	4	69.8
19.1	17.5	9.9	RSC	Beef butt, shell top	4	69.6
19.4	11.0	6.4	OSC	Beef flank steak	8	88.9
19.5	10.3	10.6	OSC	Beef sirloin tip	8	83.7
19.5	15.3	10.5	OSC	Beef loin strip	6	93.2
				Beef brisket, boneless		
19.5	16.5	10.5	OPT	Beef round	4	67.0
19.8	11.1	12.4	OSC	Beef tenderloin	8	91.6
				Beef round, top		
20.2	16.3	6.5	OSC	Beef brisket, boneless	4	68.6
20.8	15.0	12.5	RSC	Beef sirloin tip	5	81.2
21.0	15.7	6.3	⁵ PT	Beef brisket, boneless	5	85.9
21.0	16.0	5.0	OPT	Veal clod	5	87.5
21.0	16.0	5.8	OPT	Veal kidney	5	87.5
21.9	17.0	9.2	OSC	Beef round, knuckle	4	77.6
				Beef flank steak		
				Beef trimmings		
				Beef loin, strip		
				Beef tenderloin		
				Beef brisket, boneless		
22.0	15.9	6.3	FT	Beef rib		
				Beef brisket, boneless	5	91.0
22.3	14.0	9.4	RSC	Beef sirloin tip	5	81.3
				Beef trimmings		
				Beef chuck, boneless		
				Beef fore-shank, boneless		

See footnotes at end of table.

Table 6.—Listing of corrugated fiberboard shipping containers used for fresh beef products and corresponding pallet surface utilization of space on a 48- by 40-inch pallet (no overhang)—Continued

Outside dimensions			Container type	Meat product	Maximum pallet surface utilization of space on 48- by 40-inch pallet	
Length	Width	Height			Number of containers per layer	Percent
<i>Inches</i>	<i>Width</i>	<i>Height</i>				
22.4	15.3	11.1	RSC	Beef rib Beef loin, trimmed Beef round Beef chuck, arm cut Beef chuck, blade Beef plate Beef trimming ¹	5	89.2
22.4	16.3	6.4	RSC	Beef rib	4	76.1
22.4	16.4	7.9	OSC	Beef rib	4	76.5
22.8	17.2	10.1	OPT	Beef rib	4	81.7
23.5	19.6	9.8	OSC	Beef chuck Beef tenderloin	4	96.0
23.8	18.0	9.7	OSC	Beef round, knuckle	4	89.2
24.0	19.3	10.5	OSC	Beef chuck, arm & blade	4	96.5
24.0	19.3	11.5	OSC	Beef sirloin	4	96.5
24.5	16.5	10.5	OSC	Beef sirloin tip	3	63.2
24.6	19.2	10.4	OSC	Beef loin Beef rib Beef round Beef tenderloin Beef sirloin tip Beef tongues & hearts	3	73.8
24.7	16.7	9.7	OSC	Beef loin, trimmed	3	64.5
25.2	16.1	9.5	OSC	Beef chuck	3	63.4
26.0	10.7	11.5	OSC		6	86.9
26.2	19.3	9.8	OPT		3	79.0
28.5	18.2	8.2	OSC	Beef loin	3	81.0

¹ RSC - Regular slotted container.

² OPT - One piece tuck in.

³ OSC - Overlapping slotted container.

⁴ FT - Full telescope.

⁵ PT - Part telescope.

Table 7.—Listing of corrugated fiberboard shipping containers used for fresh pork products and corresponding surface utilization of space on a 48- by 40-inch pallet (no overhang)

Outside dimensions			Container type	Meat product	Maximum pallet surface utilization of space on 48- by 40-inch pallet	
Length	Width	Height			Number of containers per layer	Percent
<i>Inches</i>	<i>Width</i>	<i>Height</i>				
11.5	8.5	4.9	¹ RSC	Pork kidney	18	91.6
13.4	10.3	6.9	RSC	Pork kidney	11	79.1
15.0	13.0	7.1	² OSC	Pork tail	9	91.4
				Pork feet		
15.1	11.2	7.3	OSC	Pork shoulder butt	10	88.0
				Fresh ham		
16.3	11.3	10.2	RSC	Pork sparerib		
				Pork shoulder butt	9	86.3
16.7	11.9	6.9	RSC	Pork sparerib	8	82.8
17.1	11.2	7.1	RSC	Pork sparerib	9	89.8
17.2	11.8	6.5	RSC	Pork sparerib	8	84.6
17.3	10.0	8.4	RSC	Pork shoulder butt	10	90.1
17.4	9.9	8.6	RSC	Pork sparerib	10	89.7
17.5	12.5	7.9	OSC	Pork sparerib	8	91.1
18.1	12.3	7.0	RSC	Pork shoulder butt	7	81.2
18.2	12.2	6.1	RSC	Pork ears	7	80.9
18.3	11.4	6.8	OSC	Pork sparerib	8	86.9
18.3	12.4	8.1	RSC	Pork shoulder butt	7	82.7
19.3	15.6	8.8	RSC	Pork shoulder butt	6	94.1
19.6	15.8	9.7	RSC	Fresh ham	6	96.8
21.0	12.1	8.4	RSC	Pork loin	6	79.4
21.8	11.6	8.4	OSC	Pork neck bones	6	79.0
22.0	10.5	6.5	OSC	Pork ears	6	72.2
22.3	12.3	6.0	OSC	Pork loin	6	85.7
22.3	13.7	8.4	OSC	Fresh ham	5	79.6
26.2	13.2	4.0	RSC	Pork bellies	4	72.1
26.5	13.5	8.5	OSC	Pork loin	4	74.5
26.8	18.0	9.0	OSC	Pork liver	3	75.4
28.0	14.0	9.5	OSC	Pork loin	3	61.2
29.2	11.0	11.5	OSC	Pork loin	4	66.9
29.3	10.7	11.9	RSC	Pork loin	5	81.6
30.1	11.0	11.4	RSC	Pork loin	4	69.0
30.5	13.1	9.9	RSC	Pork loin	4	83.2
31.5	13.8	8.2	³ FT	Pork loin	3	67.9
36.5	13.2	10.0	RSC	Pork loin	3	75.3

¹ RSC - Regular slotted container.

² OSC - Overlapping slotted container.

³ FT - Full telescope.

U. S. DEPARTMENT OF AGRICULTURE AGRICULTURAL RESEARCH SERVICE				1. DATE OF RECEIPT (1-6)		
SURVEY OF SHIPPING CONTAINERS USED FOR BOXED MEAT AND MEAT PRODUCTS				MONTH	DAY	YEAR
2. NAME OF MANAGER				3. NAME & ADDRESS OF FIRM (Warehouse)		
4. SPECIES (10) BEEF 1 <input type="checkbox"/> PORK 2 <input type="checkbox"/> LAMB 3 <input type="checkbox"/>				CITY (8) STATE (9) ZIP CODE		
5. TYPE OF MEAT PRODUCT	(11) FRESH 1 <input type="checkbox"/> (12-20)	(11) FROZEN 2 <input type="checkbox"/> (12-20)	(11) COMMINUTED 3 <input type="checkbox"/> (12-20)	(11) CURED 4 <input type="checkbox"/> (12-20)	(11) CANNED 5 <input type="checkbox"/> (12-20)	
6. NAME OF MEAT PRODUCT (Specify)						
7. TYPE OF SHIPPING CONTAINER (21) FIBERBOARD BOX 1 <input type="checkbox"/> WOODBOX 2 <input type="checkbox"/> WIREBOUND BOX 3 <input type="checkbox"/> OTHER (Specify) 4						
8. IF FIBERBOARD BOX IN ITEM 7 CHECK TYPE (22) NSC 1 <input type="checkbox"/> OSC 2 <input type="checkbox"/> FULL TELESCOPE 3 <input type="checkbox"/> ONEPIECE TUCK-IN 4 <input type="checkbox"/> OTHER (Specify) 5						
9. TYPE OF CLOSURE (23) TAPED 1 <input type="checkbox"/> STAPLED 2 <input type="checkbox"/> ADHESIVE 3 <input type="checkbox"/> WIRED 4 <input type="checkbox"/> STRAPS 5 <input type="checkbox"/> OTHER (Specify) 6						
10. IS CONTAINER LINED? (24) YES 1 <input type="checkbox"/> NO 2 <input type="checkbox"/>		11. IF "YES" IN ITEM 9 LINED WITH WHAT? (25) POLYETHYLENE BAG 1 <input type="checkbox"/> KRAFT PAPER 2 <input type="checkbox"/> POLYSTYRENE 3 <input type="checkbox"/> WAX COATED 4 <input type="checkbox"/>				
12. IS CONTAINER PARTITIONED? (26) YES 1 <input type="checkbox"/> NO 2 <input type="checkbox"/>		13. IF "YES" IN ITEM 11, WHAT TYPE OF PARTITION AND MATERIAL? (27) TOP PAD 1 <input type="checkbox"/> BOTTOM PAD 2 <input type="checkbox"/> LAYER DIVIDERS 3 <input type="checkbox"/> CELLS 4 <input type="checkbox"/> PAPERBOARD 5 <input type="checkbox"/> FIBERBOARD 6 <input type="checkbox"/> BUTCHER OR KRAFT PAPER 7 <input type="checkbox"/>				
14. NAME & LOCATION OF SOURCE OF MEAT SUPPLY (28-29) CITY (30-31) STATE (32-33)				15. NO. CONTAINERS RECEIVED AT WAREHOUSE IN A WEEK (34-38)		
16. CONTAINER OUTSIDE DIMENSIONS (Nearest 10th of an inch) LENGTH (39-41) WIDTH (42-44) DEPTH (45-47)						
17. TYPE OF PREPACKAGED WRAPPINGS (48) FILM OVERWRAP 1 <input type="checkbox"/> PAPER OVERWRAP 2 <input type="checkbox"/> POLYETHYLENE BAG 3 <input type="checkbox"/> PAPERBOARD 4 <input type="checkbox"/> PAPERBOARD WITH WINDOW 5 <input type="checkbox"/> BLISTER PAK 6 <input type="checkbox"/> NONE 7 <input type="checkbox"/>						
18. PRODUCT WEIGHT & COUNT PER CONTAINER NET WEIGHT (49-52) lbs. NO. PIECES PER BOX (53-54)				19. SIZE OF PALLETS (If used) LENGTH (55-56) in. WIDTH (57-58) in.		
20. TYPE OF PALLETS (59) WOOD 1 <input type="checkbox"/> FIBERBOARD 2 <input type="checkbox"/> METAL 3 <input type="checkbox"/> OTHER (Specify) 4				21. DRAW DIAGRAM OF STACKING PATTERN BOTTOM LAYER 2ND LAYER		
22. SIZE OF STACK NO. OF LAYERS (60-61) NO. OF CONTAINERS (62-64) PER LAYER				25. IDENTIFICATION NO. (68-71) SUPPLEMENT ATTACHED <input type="checkbox"/> (TF FORM T-22A)		
23. HOW ARE PALLETS HANDLED (65) FORKLIFT 1 <input type="checkbox"/> HANDTRUCK 2 <input type="checkbox"/> CLAMPLIFT 3 <input type="checkbox"/> OTHER (Specify) 4						
24. CONTAINER DAMAGE (66) COMMERCIAL IMPORTANCE 1 <input type="checkbox"/> NON-COMMERCIAL IMPORTANCE 2 <input type="checkbox"/> NONE 3 <input type="checkbox"/>				25. IDENTIFICATION NO. (68-71) SUPPLEMENT ATTACHED <input type="checkbox"/> (TF FORM T-22A)		
26. INTERVIEWER						